Space Weather Forecast

Issued on Wednesday, 19 April 2023 at 01:15 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Minor Geomagnetic Storms likely due to CME (Coronal Mass Ejection) activity, with a chance of Moderate or Strong Storms on 20 and 21 April. Chance of Moderate-class X-ray flares (R1-R2 Minor-Moderate radio blackouts) throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low, with only a few low-level Common-class flares observed. There are seven active regions on the visible disc. The largest region continues to be centre disc in the northern hemisphere, and this particular area appears magnetically stable. An elongated line of three regions in the south collectively present a slightly increased risk of significant flare activity as well as a relatively new region in the far east. All other regions are small and simple. No Earth-directed CME have been observed in available imagery in the last 24 hours.

Solar Wind / Geomagnetic Activity: The solar wind was initially slightly elevated before a change to elevated levels in response to a CME arrival around 18/1400UTC, with a peak of 623 km/s observed at 18/2033UTC Total magnetic field strength was at weak to moderate levels, before becoming strong for a few hours after 18/1400UTC. The important north-south component was also at weak to moderate levels with a period of negative orientation observed around 18/1600UTC as strong levels were reached. Geomagnetic activity was Quiet.to Unsettled becoming Active by 18/1500UTC, with a period of minor geomagnetic storms from 18/1500-1800UTC.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to generally be Low, with a chance of isolated Moderate activity. There is also a chance for activity from a region beyond the northeastern limb, which is forecast to rotate onto the visible disc by day 2 (20 April).

Solar Wind / Geomagnetic Activity: Two CMEs may affect the Earth in this period. The first carries low confidence for a glancing blow on day 1 (19 Apr), with a further more direct CME hit, forecast on days 2 or 3 (20 or 21 Apr). Otherwise solar winds are expected to become slightly elevated with an initial period more predominantly at elevated levels as a result of the CME that impacted the Earth on 18 April. Geomagnetic activity is forecast to be Unsettled to Active with further Minor storm intervals, especially due to the potential glancing CME on 19 Apr. Activity is expected to reach Minor Storm levels on 20 or 21 Apr due to the anticipated second CME arrival, with a chance of Moderate or Strong Storm conditions.

Energetic Particles / Solar Radiation: Solar radiation storms are not expected and should remain at background levels.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	50	60	60	30
Strong	G3	No	10	30	30	10
Severe	G4	No	1	5	5	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	40	40	50	50
Very Active	R3 to R5 X	No	1	1	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	1	1	1
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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